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DIRECTORATE OF INTELLIGENCE

Intelligence Memorandum

The Tan-Zam Railroad: Progress And Prospects

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
November 1970

INTELLIGENCE MEMORANDUM

The Tan-Zam Railroad: Progress And Prospects

Introduction

On 26 October 1970, Tanzania, Zambia, and Communist China formally inaugurated construction of the Tan-Zam Railroad. Communist China is lending Tanzania and Zambia the equivalent of $400 million to build the 1,100-mile railroad between Zambia's Copperbelt and the port of Dar es Salaam. The final protocol was signed by the three countries on 12 July 1970 in Peking.

When the railroad is completed in 1975 or 1976, landlocked Zambia, now largely dependent on railroads running through white-ruled southern Africa, will be able to ship most of its copper exports, which provide more than 90% of its foreign exchange, through Tanzania to Dar es Salaam. This memorandum presents the background and nature of the construction project and assesses the potential economic implications of the railroad to Tanzania and Zambia.

Background

1. The idea of a rail link between Tanzania and Zambia is hardly new. It dates back to the time of Cecil Rhodes, who first proposed a British railway from Cairo to Capetown. After independence

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in 1964, Lusaka revived the Tanzania leg of the project as a means to break its dependence on the railroad controlled by white-ruled Rhodesia. Tanzania supported Zambia's proposal since the railroad would open southwestern Tanzania to agricultural and minerals development and lead to expanding Dar es Salaam's port facilities.

2. At the time of Rhodesia's Unilateral Declaration of Independence (UDI) in 1965, almost all of landlocked Zambia's foreign trade of about $825 million was carried by the Rhodesian Railroad between Zambia and the port of Beira in Mozambique. When sanctions against Rhodesia were introduced in 1966, Zambia attempted to phase out its Rhodesian links as fast as possible. As a temporary expedient Lusaka organized an airlift between Dar es Salaam and the Copperbelt that could carry 5,000 tons per month, but when it became clear that no solution to the Rhodesian problem was likely in the short run, Zambia turned to other alternatives. Among them were greater use of the railroad through Congo (Kinshasa) to the port of Lobito in Portuguese Angola and the upgrading and reconstructing of the Great North Road as a truck route through Tanzania and the Great East Road to Malawi. In September 1968, an Italian financed 1,000-mile 8-inch oil pipeline with a flow of 300,000 tons per year went into operation between Dar es Salaam and the Copperbelt (Zambia's imports of POL in 1967 were about 300,000 tons). The alternative routes, however, have been unable to carry all of Zambia's exports and imports, and the country still depends on the Rhodesian Railroad to transport more than half of its foreign trade of about 3.6 million tons, of which about half is coal and POL. The breakdown of Zambia's trade,

by the various routes, in 1967 was as given in the accompanying tabulation*:

	Percent	
	Imports (POL, General Goods, Coal)	Exports (Copper)
Lobito	3	19
Great North Road	9	26
Great East Road	2	7
Zambian air cargoes	1	4
Rhodesian transport	84	43
Other	1	1
Total	*100*	*100*

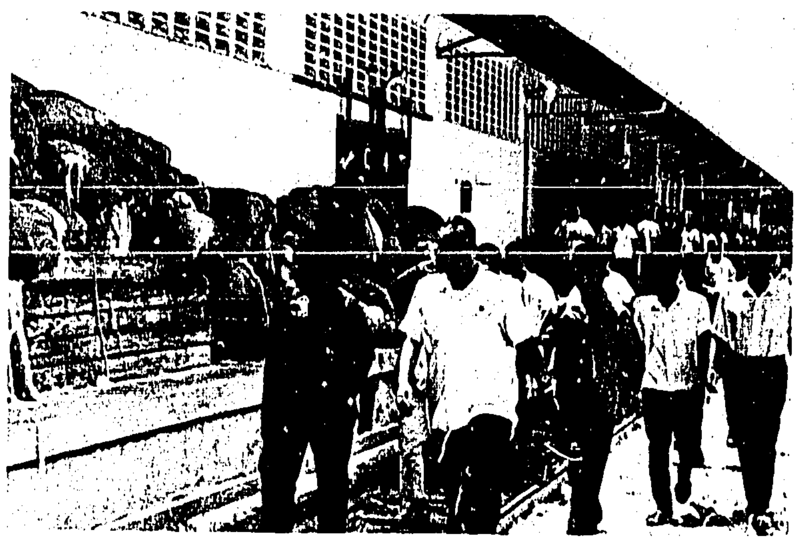
3. In Zambia's view, the only long-term solution was a railroad to Dar es Salaam. Initially Lusaka sought financial aid from the United States, which had agreed to help in upgrading the Great North Road, but was refused on the grounds that the cost, including interest on capital, far exceeded the potential gain. Communist China made the first firm offer to help in June 1967, and in the following September a joint Tanzanian-Zambian economic mission in Peking signed a preliminary agreement under which China agreed to build and finance the proposed railway. Since then, Chinese technicians have completed a design and engineering survey and have directed much of the preparatory construction work (see Figures 1 and 2). Communist China also has provided a large supply of necessary equipment and materials. The final agreement was signed by Chinese, Tanzanian, and Zambian government representatives in Peking in July 1970, and the project officially got under way on 26 October 1970.

* *This is the latest breakdown for which data are available. It seems likely, however, that the situation in 1970 will be quite similar except that the petroleum pipeline is now in use.*

Figure 1

Chinese surveying team on the rail link between Tanzania and Zambia, 1969

Figure 2



Chinese railway experts tour East African Railway workshops in Dar es Salaam, 1969

The Railroad

4. Many preliminary construction operations already have begun. The Chinese have established at least six construction camps along the proposed right of way and have purchased tractors, trucks, and other equipment from Japan and Western Europe. Chinese ships are delivering a steady stream of rails, crossties, and other construction material to Dar es Salaam. The first ship arrived in September 1969, carrying 1,800 tons of track and other rail equipment. In October 1970 the Chinese had an estimated 1,000 vehicles in Tanzania, including heavy-duty trucks, bulldozers, and other mechanical equipment. About 4,000 Chinese technicians already are at work clearing the right of way and staking railroad bridges and embankments, and 2,000 more are expected by the year's end.

5. The railroad is scheduled for completion in 1975 or 1976. Construction will begin in Tanzania and run about 1,100 miles to the existing rail network at the Zambian village of Kapiri Mposhi.* There will be about 570 miles of track in Tanzania and 530 miles in Zambia. The railroad's capacity is scheduled to total nearly 5 million tons per year, enough to meet Zambia's requirements well into the 1980s. When the line opens in 1975 or 1976, the Africans expect to have enough rolling stock and other equipment to carry about 2 million tons of goods per year. The Tan-Zam Railroad's 3'6" gauge will be compatible with Zambia's system but not with East African Railway's meter gauge (3'2.7") in Tanzania.** Both the Great North Road,*** scheduled for completion in 1971, and the oil pipeline will roughly parallel the new railway.

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* *Working out from one terminus is an unusual technique for the Chinese, who normally work on the entire railway simultaneously. Work on bridges, tunnels, and roadbed usually is started along the entire length of the line at about the same time.*

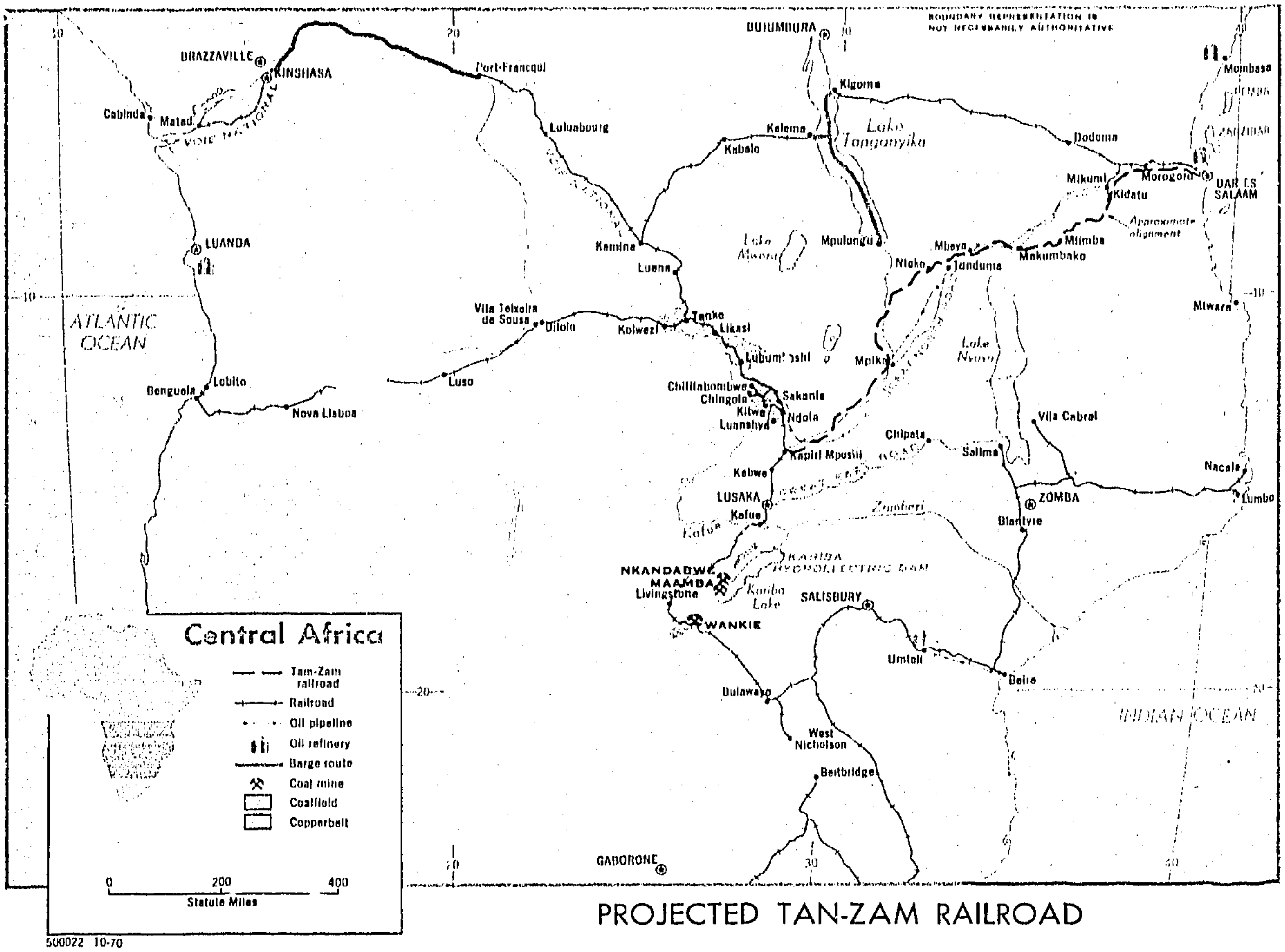
** *China has most of its railway network on the standard gauge (4'8½") system, also used in the United States and the United Kingdom.*

*** *The capacity of the highway is about 300,000 tons per year in each direction.*

6. Significant contrasts in terrain challenge the builders. The route traverses the coastal plains of Tanzania and the adjacent Kilombero valley, rises on the steep Lumuwe-Kitete escarpment to Makumbako, crosses the Southern Highlands and drops gradually into the Chambezi plains in northern Zambia and on to the Copperbelt region. The highlands region in southwest Tanzania, part of the Great Rift Valley, contains extremely rugged hills, mountains, and deep valleys, and construction in the worst section (40 miles long) will require embankments and cuttings of up to 80 feet. No construction difficulties are expected in Zambia where the line will cross fairly level plateaus (see the map, Figure 3).

Assessment of Chinese Involvement

7. Communist China's railroad technical personnel are well qualified to meet the Tan-Zam Railroad's technological requirements. During the past several years, the Chinese, with approximately 2,000 miles of lines completed, have led the world in railroad construction and have completed rail projects under topographical conditions comparable to those prevailing in Tanzania. China's railroad expertise is particularly suited to the labor-intensive methods that will employ upwards of 20,000 Africans (see Figures 4 and 5). Estimated Chinese participation varies from 4,000 to 6,000 workers at any one time, practically all of whom would be technical workers. Most of these probably will be from the People's Liberation Army Railroad Construction Corps, which normally is employed for skilled railroad construction work, such as tunneling and bridgebuilding. In China, the Construction Corps is aided by civilians -- often as many as 100,000 workers. For China, the project is a major political investment, a factor that would make failure particularly disastrous. It will be the largest single overseas project Peking has ever attempted. In comparison, the largest foreign aid projects undertaken earlier by China have been within the $15 to $20 million range: a roadbuilding project in Nepal, a glass factory in Cambodia, and a dam on the Ruvu River in Tanzania.

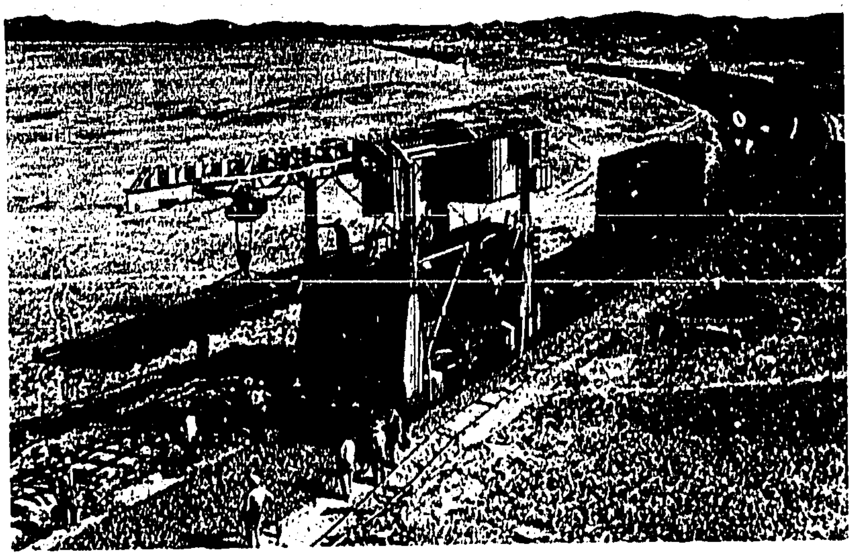


PROJECTED TAN-ZAM RAILROAD

Figure 4

Chinese tracklaying operation using a labor-intensive method

Figure 5



Chinese tracklaying operation using sophisticated equipment

Negotiations and Financing

8. Under the July 1970 protocols, Peking will provide a $400 million interest-free credit to build the railway as well as to purchase some rolling stock and locomotives.* The credit, extended under a tripartite agreement of September 1967, can be drawn down over a 10-year period, retroactive to 1 January 1968, the date the survey began. Zambia and Tanzania will share the cost of the loan equally. Repayment is over a 30-year period beginning in 1983, including a five-year grace period. The duration of the loan is, therefore, 45 years.

9. Two separate financial arrangements are being used: a long-term loan to cover external construction costs and rolling and motive stock purchases, and a commodity credit arrangement to defray local expenses during construction. The long-term loan is primarily for purchasing capital goods and is semi-tied, so most goods will come from China. Under the commodity credit arrangement, the Tanzanians and Zambians will also purchase Chinese goods -- chiefly consumer goods -- on credit, but will sell them in domestic markets and use the proceeds to pay local costs associated with building the railroad. Tanzanian and Zambian purchasing missions in China already have selected a limited range of products -- chiefly textiles, bicycles, and canned foods -- and are investigating price and quality of such items as tractors, water pumps, transportation vehicles, and industrial raw materials. The value of these commodity credit purchases will be added to the long-term loan. If sufficient funds for the local costs cannot be raised by selling Chinese goods domestically, the balance will be defrayed from Tanzanian and Zambian budgets.

Definition of Costs

10. In building the railroad Tanzania and Zambia will incur external construction costs, local construction costs, purchases of rolling

* *The estimated requirements through the period of construction and the first 10 years of operation are 50 locomotives costing $15.5 million and 7,500 freight cars costing $115 million.*

and motive stock, and expenditures on ancillary projects. External costs derive from purchases of goods and services outside Tanzania and Zambia -- for example, construction machinery, rail laying equipment, and Chinese technical services. Local costs are defined in the 1968 tripartite protocols to include local building materials, freight and miscellaneous charges, African workers' wages, land purchases, and the living expenses of Chinese technical personnel. Locomotives and other rolling stock probably will be furnished entirely by China, either from its own factories or from other world suppliers with the Chinese acting as purchasing agent. Very little rolling stock is likely to be transferred from the existing Zambian railroad system because of Zambia's growing internal transportation needs.* Ancillary costs are primarily those incurred by expanding port facilities at Dar es Salaam and constructing a variety of manufacturing enterprises needed to build the railroad.

Local Costs

11. The long-term financing arrangements of the loan will delay repayment for possibly 13 years, but local construction costs, as well as those for ancillary projects, will make demands on the African economies during construction. In Tanzania, local costs will amount to about $104 million, or $15-$20 million a year. China is willing to provide commodities on long-term credit terms to cover the local costs of the project. It is unlikely, however, that this volume of Chinese goods can be absorbed on local markets. The Tanzanian government apparently plans to increase its imports from China, excluding the capital goods for the project, by only $5.7 million a year during 1970-74,** and to cover

* *As of early 1970, rolling stock of Zambia's railways consisted of 95 steam locomotives, 25 diesel electric locomotives, 1,300 freight cars of various types, 200 passenger coaches, and a number of service vehicles. In Zambia's gross domestic product, the value of transportation services increased by almost 68% between 1966 and 1968.*

** *Imports from China have averaged about $11 million, less than 6% of Tanzanian imports from outside Africa.*

the remaining yearly local costs ($10-$15 million) from its own budgetary sources. In any event, the financial problem is not large. Total Tanzanian imports are $200 million annually and the economic development budget is close to $50 million.

12. Zambia's plans are not known, but its healthy foreign exchange reserves ($450 million in mid-1970) would permit full payment of local costs if Lusaka wished to. In any event, Zambia's imports from China have been considerably smaller than Tanzania's, averaging in recent years about $1 million annually, and since Zambia has fewer domestic manufactures and a much higher level of foreign trade than Tanzania, Lusaka should be able to absorb a greater quantity of Chinese goods. Yearly imports from China of the same magnitude as that scheduled for Tanzania -- $16 to $17 million -- will constitute a little more than 3% of Zambia's overall annual import bill of about $500 million.

Ancillary Costs

13. The ultimate scope of ancillary projects is still unclear. The planned construction of a railway hardware factory in Tanzania has been reported, as well as the expansion of port facilities at Dar es Salaam, but the Chinese loan does not appear to cover the cost of the latter. In 1969 the port handled more than 1.1 million tons of dry cargo, of which an estimated 450,000 tons were Zambian tonnages. Of vital importance to Zambia are current efforts to increase the port's capacity by constructing three new deepwater berths costing some $1.1 million. Completion is scheduled by late 1970 or early 1971, and harbor authorities predict they will be able to handle the 1971 volume of cargo without difficulty.

14. Zambian tonnage through the port is expected to continue to rise, however, and the increase will accelerate sharply when the railway is completed. A large proportion of Zambia's trade will then pass through the port -- estimates for 1976 are almost 2.0 million tons per year. This tonnage should eliminate completely Zambia's need to use the Rhodesian Railways. Depending on

the volume of traffic from Zambia, total shipments of dry cargo through the port could be nearly 3 million tons by 1980. Further plans to cope with this expansion are in preparation, for which the East African Harbor Corporation, which runs the port, will receive World Bank assistance.

Availability of Local Labor

15. Most of the labor force will be from Tanzania and Zambia. An estimated total of about 20,000 workers from both countries will be employed. The workers will be primarily unskilled laborers who hopefully will acquire new skills working with the Chinese. Although the supply of unskilled Africans is practically limitless, skilled technicians, especially railway operating and construction staff, are in extremely short supply in both countries. Initially the supervisory staff and skilled labor, down to foreman and key artisan level, will have to be furnished by China.

Economic Advantages of the Railroad

16. Both Tanzania and Zambia see many new development opportunities along the route of the railway, including exploiting coal and iron deposits in southern Tanzania and copper deposits in northern Zambia and developing potentially rich agricultural regions in these same areas. In addition, equipment and maintenance demands of the railroad and its ancillary installations will stimulate development in forestry, manufacturing, and construction. Sizable increases in the capacity at Dar es Salaam's port will be especially beneficial to Tanzania. In 1968 the port's revenues were $8.9 million.

17. Although economic development in Tanzania and Zambia will be aided eventually by the railroad, the more immediate impact will be to decrease Rhodesia's control over Zambia's access to the sea. Through measures adopted so far, Zambia has managed to reroute from Rhodesian carriers nearly 60% of its exports, mostly copper, but only about 20% of its imports, primarily because of continued dependence on imports from Rhodesia and South Africa and on the Rhodesian rail links for direct sea connections with the port of Beira.

The new railroad is expected to meet projected needs through 1985. Estimated distribution of Zambia's copper exports in 1969 was as in the accompanying tabulation:

Route	Thousand Metric Tons
Great North Road	227.5
Via Mpanda, Tanzania	6.1
Lobito	116.9
Rhodesian Railroad	264.5
Total	*615.0*

18. A major advantage for Zambia will be lower transportation costs. At present, only about 25% of the distance traveled from the Zambian Copperbelt through Rhodesia to Beira is on Zambian rail lines. For the Lobito route the comparable distance is less than 5%. Zambia has little control over the freight rates on these connecting lines and in the past has been subjected to sharp rate increases. For example, when Zambia began exploiting its own coal deposits in the Batoga area to lessen dependence on Rhodesia's Wanki coal, Rhodesia retaliated by increasing freight rates on copper and other commodities on Rhodesian rail lines by 39%.

19. Under the terms of the loan, Zambia and Tanzania will have until 1983 to make initial repayments to China, but profits from the project could be realized much earlier. On the basis of the assumed traffic that would be diverted from the existing routes to the new line, an estimated net operating revenue of $28.8 million could be obtained in 1980 and $33.6 million in 1983.*

** The net operating revenue estimates postulate that the revenue attributable to the Tan-Zam line should be the same as the freight charges that would be payable for carrying the same tonnage by the cheapest existing railway system (the Zambian/Rhodesia/Mozambique route) less the loss that would be incurred by Zambia from the diversion of traffic from that part of the existing route that lies within Zambian territory.*

These projected returns, together with the interest-free aspects of the $400 million 30-year loan, appear to insure the possibility of a sound financial future for the railroad in both countries.

20. Present carriers, but primarily the Rhodesian Railroad, will lose substantial revenues when the Tan-Zam line starts operating (perhaps $20 million for Rhodesia and Mozambique and $10 million for Angola). It may take at least five years after opening the new line before the Rhodesian and Mozambique Railways regain their present profitability through growth of the Rhodesian economy. In 1968 about 75% of the total freight revenues of about $59 per ton for Zambian copper went to Rhodesia and Mozambique. Of the total freight revenues of $60 per ton for copper from the Copperbelt to the port of Lobito, 92% was received by the Benguela Railroad of Angola.

Conclusions

21. Along with meeting Lusaka's overriding political objective of ending its transport dependence on Rhodesia, the Tan-Zam rail line will be of considerable economic benefit to both Zambia and Tanzania. The terms provided by China are so generous that the capital for the railroad is in effect being provided free of charge. From the beginning of operations, the Zambian and Tanzanian governments expect the rail line to generate revenues in excess of operating costs. The rail line should also encourage development projects, especially in Tanzania, that require relatively inexpensive transportation to and from major ports and markets. Technically, Tanzania's port of Dar es Salaam can be expanded to handle the probable traffic, and planning for this expansion is already under way.

22. Neither Zambia nor Tanzania is likely to suffer significant economic dislocations because of the railroad construction. Financing local costs with a combination of Chinese commodity sales and normal government revenues is not

expected to pose any real problems. Meeting the repayment schedule for the long-term loan -- about $7 million annually for each country -- almost certainly will be made out of operating profits and still could leave substantial revenues for other development purposes. In any event, repayment does not begin until 1983.

23. By committing itself to financing the new railroad, Communist China has become a major foreign aid donor in Africa. This is a massive undertaking, second among foreign aid projects in Africa only to the Aswan Dam. Its $400 million cost nearly matches the total of all other Chinese aid extended to Africa to date, and the terms of the loan are extremely generous.